



SEQUENCE LISTING

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KANAI, Yoshikatsu
SEKINE, Takashi
HOSOYAMADA, Makoto

<120> ORGANIC ANION TRANSPORTER AND GENE
CODING FOR THE SAME

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<140> 09/424,347

<141> 2000-07-18

<150> PCT/JP98/02171

<151> 1998-05-18

<160> 4

<170> FastSEQ for Windows Version 3.0

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<211> 2171

<212> DNA

<213> Rat

<220>

<221> CDS

<222> (268)...(1956)

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gcagctcgga	ctcagctccc	ggagcaaccc	agctgctggg	gcaacggcag	tgctgctcct	180
ccagcgaagg	acagcaggca	ggcagacaga	cagaggtcct	gggactggaa	ggcctcagcc	240
cccagccact	gggctggggc	tggccca	atg gcc ttt	aat gac ctc	ctg cag cag	294
			Met Ala Phe	Asn Asp	Leu Leu Gln Gln	
			1	5		

gtg ggg ggt	gtc ggc cgc	ttc cag cag	atc cag gtc	acc ctg	gtg gtc	342
Val Gly Gly	Val Gly Arg	Phe Gln Gln	Ile Gln Val	Thr Leu	Val Val	
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ctc ccc ctg	ctc ctg atg	gct tct cac	aac acc ctg	cag aac ttc	act	390
Leu Pro Leu	Leu Leu Met	Ala Ser His	Asn Thr Leu	Gln Asn Phe	Thr	
30	35	40				

gct gcc atc	cct acc cac	cac tgc cgc	ccg cct gcc	gat gcc aac	ctc	438
Ala Ala Ile	Pro Thr His	His Cys Arg	Pro Pro Ala	Asp Ala Asn	Leu	
45	50	55				

agc aag aac	ggg ggg ctg	gag gtc tgg	ctg ccc cgg	gac agg	cag ggg	486
Ser Lys Asn	Gly Gly Leu	Glu Val Trp	Leu Pro Arg	Asp Arg	Gln Gly	
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ttt ctc aat ggc aca gaa gcc aat ggc aca ggg gcc aca gag ccc tgc Phe Leu Asn Gly Thr Glu Ala Asn Gly Thr Gly Ala Thr Glu Pro Cys 90 95 100 105	582
acc gat ggc tgg atc tat gac aac agc acc ttc cca tct acc atc gtg Thr Asp Gly Trp Ile Tyr Asp Asn Ser Thr Phe Pro Ser Thr Ile Val 110 115 120	630
act gag tgg gac ctt gtg tgc tct cac agg gcc cta cgc cag ctg gcc Thr Glu Trp Asp Leu Val Cys Ser His Arg Ala Leu Arg Gln Leu Ala 125 130 135	678
cag tcc ttg tac atg gtg ggg gtg ctg ctc gga gcc atg gtg ttc ggc Gln Ser Leu Tyr Met Val Gly Val Leu Leu Gly Ala Met Val Phe Gly 140 145 150	726
tac ctt gca gac agg cta ggc cgc cgg aag gta ctc atc ttg aac tac Tyr Leu Ala Asp Arg Leu Gly Arg Arg Lys Val Leu Ile Leu Asn Tyr 155 160 165	774
ctg cag aca gct gtg tca ggg acc tgc gca gcc ttc gca ccc aac ttc Leu Gln Thr Ala Val Ser Gly Thr Cys Ala Ala Phe Ala Pro Asn Phe 170 175 180 185	822
ccc atc tac tgc gcc ttc cgg ctc ctc tgc ggc atg gct ctg gct ggc Pro Ile Tyr Cys Ala Phe Arg Leu Leu Ser Gly Met Ala Leu Ala Gly 190 195 200	870
atc tcc ctc aac tgc atg aca ctg aat gtg gag tgg atg ccc att cac Ile Ser Leu Asn Cys Met Thr Leu Asn Val Glu Trp Met Pro Ile His 205 210 215	918
aca cgg gcc tgc gtg ggc acc ttg att ggc tat gtc tac agc ctg ggc Thr Arg Ala Cys Val Gly Thr Leu Ile Gly Tyr Val Tyr Ser Leu Gly 220 225 230	966
cag ttc ctc ctg gct ggt gtg gcc tac gct gtg ccc cac tgg cgc cac Gln Phe Leu Leu Ala Gly Val Ala Tyr Ala Val Pro His Trp Arg His 235 240 245	1014
ctg cag cta ctg gtc tct gcg cct ttt ttt gcc ttc ttc atc tac tcc Leu Gln Leu Leu Val Ser Ala Pro Phe Phe Ala Phe Phe Ile Tyr Ser 250 255 260 265	1062
tgg ttc ttc att gag tgc gcc cgc tgg cac tcc tcc tcc ggg agg ctg Trp Phe Phe Ile Glu Ser Ala Arg Trp His Ser Ser Ser Gly Arg Leu 270 275 280	1110
gac ctc acc ctg agg gcc ctg cag aga gtc gcc cgg atc aat ggg aag Asp Leu Thr Leu Arg Ala Leu Gln Arg Val Ala Arg Ile Asn Gly Lys 285 290 295	1158
cgg gaa gaa gga gcc aaa ttg agt atg gag gta ctc cgg gcc agt ctg	1206

Arg Glu Glu Gly Ala Lys Leu Ser Met Glu Val Leu Arg Ala Ser Leu	
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cag aag gag ctg acc atg ggc aaa ggc cag gca tgc gcc atg gag ctg	1254
Gln Lys Glu Leu Thr Met Gly Lys Gly Gln Ala Ser Ala Met Glu Leu	
315 320 325	
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Leu Arg Cys Pro Thr Leu Arg His Leu Phe Leu Cys Leu Ser Met Leu	
330 335 340 345	
tgg ttt gcc act agc ttt gca tac tat ggg ctg gtc atg gac ctg cag	1350
Trp Phe Ala Thr Ser Phe Ala Tyr Tyr Gly Leu Val Met Asp Leu Gln	
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ggc ttt gga gtc agc atc tac cta atc cag gtg atc ttt ggt gct gtg	1398
Gly Phe Gly Val Ser Ile Tyr Leu Ile Gln Val Ile Phe Gly Ala Val	
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gac ctg cct gcc aag ctt gtg ggc ttc ctt gtc atc aac tcc ctg ggt	1446
Asp Leu Pro Ala Lys Leu Val Gly Phe Leu Val Ile Asn Ser Leu Gly	
380 385 390	
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Arg Arg Pro Ala Gln Met Ala Ala Leu Leu Leu Ala Gly Ile Cys Ile	
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ctg ctc aat ggg gtg ata ccc cag gac cag tcc att gtc cga acc tct	1542
Leu Leu Asn Gly Val Ile Pro Gln Asp Gln Ser Ile Val Arg Thr Ser	
410 415 420 425	
ctt gct gtg ctg ggg aag ggt tgt ctg gct gcc tcc ttc aac tgc atc	1590
Leu Ala Val Leu Gly Lys Gly Cys Leu Ala Ala Ser Phe Asn Cys Ile	
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Phe Leu Tyr Thr Gly Glu Leu Tyr Pro Thr Met Ile Arg Gln Thr Gly	
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Met Gly Met Gly Ser Thr Met Ala Arg Val Gly Ser Ile Val Ser Pro	
460 465 470	
ctg gtg agc atg act gcc gag ctc tac ccc tcc atg cct ctc ttc atc	1734
Leu Val Ser Met Thr Ala Glu Leu Tyr Pro Ser Met Pro Leu Phe Ile	
475 480 485	
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Tyr Gly Ala Val Pro Val Ala Ala Ser Ala Val Thr Val Leu Leu Pro	
490 495 500 505	
gag acc ctg ggc cag cca ctg cca gac acg gtg cag gac ctg gag agc	1830
Glu Thr Leu Gly Gln Pro Leu Pro Asp Thr Val Gln Asp Leu Glu Ser	
510 515 520	
agg tgg gcc ccc act cag aaa gaa gca ggg ata tat ccc agg aaa ggg	1878
Arg Trp Ala Pro Thr Gln Lys Glu Ala Gly Ile Tyr Pro Arg Lys Gly	

525

530

535

aaa cag acg cga cag caa caa gag cac cag aag tat atg gtc cca ctg 1926
 Lys Gln Thr Arg Gln Gln Gln Glu His Gln Lys Tyr Met Val Pro Leu
 540 545 550

cag gcc tca gca caa gag aag aat gga ctc tgaggactga gaaggggcct 1976
 Gln Ala Ser Ala Gln Glu Lys Asn Gly Leu
 555 560

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 Ser His Asn Thr Leu Gln Asn Phe Thr Ala Ala Ile Pro Thr His His
 35 40 45
 Cys Arg Pro Pro Ala Asp Ala Asn Leu Ser Lys Asn Gly Gly Leu Glu
 50 55 60
 Val Trp Leu Pro Arg Asp Arg Gln Gly Gln Pro Glu Ser Cys Leu Arg
 65 70 75 80
 Phe Thr Ser Pro Gln Trp Gly Leu Pro Phe Leu Asn Gly Thr Glu Ala
 85 90 95
 Asn Gly Thr Gly Ala Thr Glu Pro Cys Thr Asp Gly Trp Ile Tyr Asp
 100 105 110
 Asn Ser Thr Phe Pro Ser Thr Ile Val Thr Glu Trp Asp Leu Val Cys
 115 120 125
 Ser His Arg Ala Leu Arg Gln Leu Ala Gln Ser Leu Tyr Met Val Gly
 130 135 140
 Val Leu Leu Gly Ala Met Val Phe Gly Tyr Leu Ala Asp Arg Leu Gly
 145 150 155 160
 Arg Arg Lys Val Leu Ile Leu Asn Tyr Leu Gln Thr Ala Val Ser Gly
 165 170 175
 Thr Cys Ala Ala Phe Ala Pro Asn Phe Pro Ile Tyr Cys Ala Phe Arg
 180 185 190
 Leu Leu Ser Gly Met Ala Leu Ala Gly Ile Ser Leu Asn Cys Met Thr
 195 200 205
 Leu Asn Val Glu Trp Met Pro Ile His Thr Arg Ala Cys Val Gly Thr
 210 215 220
 Leu Ile Gly Tyr Val Tyr Ser Leu Gly Gln Phe Leu Leu Ala Gly Val
 225 230 235 240
 Ala Tyr Ala Val Pro His Trp Arg His Leu Gln Leu Leu Val Ser Ala
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 Pro Phe Phe Ala Phe Phe Ile Tyr Ser Trp Phe Phe Ile Glu Ser Ala
 260 265 270
 Arg Trp His Ser Ser Ser Gly Arg Leu Asp Leu Thr Leu Arg Ala Leu
 275 280 285

Gln Arg Val Ala Arg Ile Asn Gly Lys Arg Glu Glu Gly Ala Lys Leu
 290 295 300
 Ser Met Glu Val Leu Arg Ala Ser Leu Gln Lys Glu Leu Thr Met Gly
 305 310 315 320
 Lys Gly Gln Ala Ser Ala Met Glu Leu Leu Arg Cys Pro Thr Leu Arg
 325 330 335
 His Leu Phe Leu Cys Leu Ser Met Leu Trp Phe Ala Thr Ser Phe Ala
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 Tyr Tyr Gly Leu Val Met Asp Leu Gln Gly Phe Gly Val Ser Ile Tyr
 355 360 365
 Leu Ile Gln Val Ile Phe Gly Ala Val Asp Leu Pro Ala Lys Leu Val
 370 375 380
 Gly Phe Leu Val Ile Asn Ser Leu Gly Arg Arg Pro Ala Gln Met Ala
 385 390 395 400
 Ala Leu Leu Leu Ala Gly Ile Cys Ile Leu Leu Asn Gly Val Ile Pro
 405 410 415
 Gln Asp Gln Ser Ile Val Arg Thr Ser Leu Ala Val Leu Gly Lys Gly
 420 425 430
 Cys Leu Ala Ala Ser Phe Asn Cys Ile Phe Leu Tyr Thr Gly Glu Leu
 435 440 445
 Tyr Pro Thr Met Ile Arg Gln Thr Gly Met Gly Met Gly Ser Thr Met
 450 455 460
 Ala Arg Val Gly Ser Ile Val Ser Pro Leu Val Ser Met Thr Ala Glu
 465 470 475 480
 Leu Tyr Pro Ser Met Pro Leu Phe Ile Tyr Gly Ala Val Pro Val Ala
 485 490 495
 Ala Ser Ala Val Thr Val Leu Leu Pro Glu Thr Leu Gly Gln Pro Leu
 500 505 510
 Pro Asp Thr Val Gln Asp Leu Glu Ser Arg Trp Ala Pro Thr Gln Lys
 515 520 525
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 ccagcgaagg acagcaggca ggcagacaga cagaggtcct gggactggaa ggcctcagcc 240
 cccagccact gggctggggc tggccca atg gcc ttt aat gac ctc ctg cag cag 294
 Met Ala Phe Asn Asp Leu Leu Gln Gln

1

5

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 Val Gly Gly Val Gly Arg Phe Gln Gln Ile Gln Val Thr Leu Val Val

342

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Leu Pro Leu Leu Leu Met Ala Ser His Asn Thr Leu Gln Asn Phe Thr				
	30	35	40	
gct gcc atc cct acc cac cac tgc cgc ccg cct gcc gat gcc aac ctc				438
Ala Ala Ile Pro Thr His His Cys Arg Pro Pro Ala Asp Ala Asn Leu				
	45	50	55	
agc aag aac ggg ggg ctg gag gtc tgg ctg ccc cgg gac agg cag ggg				486
Ser Lys Asn Gly Gly Leu Glu Val Trp Leu Pro Arg Asp Arg Gln Gly				
	60	65	70	
cag cct gag tcc tgc ctc cgc ttc acc tcc ccg cag tgg gga ctg ccc				534
Gln Pro Glu Ser Cys Leu Arg Phe Thr Ser Pro Gln Trp Gly Leu Pro				
	75	80	85	
ttt ctc aat ggc aca gaa gcc aat ggc aca ggg gcc aca gag ccc tgc				582
Phe Leu Asn Gly Thr Glu Ala Asn Gly Thr Gly Ala Thr Glu Pro Cys				
	90	95	100	105
acc gat ggc tgg atc tat gac aac agc acc ttc cca tct acc atc gtg				630
Thr Asp Gly Trp Ile Tyr Asp Asn Ser Thr Phe Pro Ser Thr Ile Val				
	110	115	120	
act gag tgg gac ctt gtg tgc tct cac agg gcc cta cgc cag ctg gcc				678
Thr Glu Trp Asp Leu Val Cys Ser His Arg Ala Leu Arg Gln Leu Ala				
	125	130	135	
cag tcc ttg tac atg gtg ggg gtg ctg ctc gga gcc atg gtg ttc ggc				726
Gln Ser Leu Tyr Met Val Gly Val Leu Leu Gly Ala Met Val Phe Gly				
	140	145	150	
tac ctt gca gac agg cta ggc cgc cgg aag gta ctc atc ttg aac tac				774
Tyr Leu Ala Asp Arg Leu Gly Arg Arg Lys Val Leu Ile Leu Asn Tyr				
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Leu Gln Thr Ala Val Ser Gly Thr Cys Ala Ala Phe Ala Pro Asn Phe				
	170	175	180	185
ccc atc tac tgc gcc ttc cgg ctc ctc tgc ggc atg gct ctg gct ggc				870
Pro Ile Tyr Cys Ala Phe Arg Leu Leu Ser Gly Met Ala Leu Ala Gly				
	190	195	200	
atc tcc ctc aac tgc atg aca ctg aat gtg gag tgg atg ccc att cac				918
Ile Ser Leu Asn Cys Met Thr Leu Asn Val Glu Trp Met Pro Ile His				
	205	210	215	
aca cgg gcc tgc gtg ggc acc ttg att ggc tat gtc tac agc ctg ggc				966
Thr Arg Ala Cys Val Gly Thr Leu Ile Gly Tyr Val Tyr Ser Leu Gly				
	220	225	230	
cag ttc ctc ctg gct ggt gtg gcc tac gct gtg ccc cac tgg cgc cac				1014
Gln Phe Leu Leu Ala Gly Val Ala Tyr Ala Val Pro His Trp Arg His				
	235	240	245	

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gac ctc acc ctg agg gcc ctg cag aga gtc gcc cgg atc aat ggg aag Asp Leu Thr Leu Arg Ala Leu Gln Arg Val Ala Arg Ile Asn Gly Lys 285 290 295	1158
cgg gaa gaa gga gcc aaa ttg agt atg gag gta ctc cgg gcc agt ctg Arg Glu Glu Gly Ala Lys Leu Ser Met Glu Val Leu Arg Ala Ser Leu 300 305 310	1206
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ctg cgc tgc ccc acc ctc cgc cac ctc ttc ctc tgc ctc tcc atg ctg Leu Arg Cys Pro Thr Leu Arg His Leu Phe Leu Cys Leu Ser Met Leu 330 335 340 345	1302
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ttc ctg tat act ggg gaa ctg tat ccc aca atg atc cgg cag aca ggc Phe Leu Tyr Thr Gly Glu Leu Tyr Pro Thr Met Ile Arg Gln Thr Gly 445 450 455	1638
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Leu Val Ser Met Thr Ala Glu Leu Tyr Pro Ser Met Pro Leu Phe Ile	
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Tyr Gly Ala Val Pro Val Ala Ala Ser Ala Val Thr Val Leu Leu Pro	
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Glu Thr Leu Gly Gln Pro Leu Pro Asp Thr Val Gln Asp Leu Glu Ser	
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Arg Trp Ala Pro Thr Gln Lys Glu Ala Gly Ile Tyr Pro Arg Lys Gly	
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Lys Gln Thr Arg Gln Gln Gln Glu His Gln Lys Tyr Met Val Pro Leu	
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Gln Ala Ser Ala Gln Glu Lys Asn Gly Leu	
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Ser His Asn Thr Leu Gln Asn Phe Thr Ala Ala Ile Pro Thr His His	45
35 40	
Cys Arg Pro Pro Ala Asp Ala Asn Leu Ser Lys Asn Gly Gly Leu Glu	60
50 55	
Val Trp Leu Pro Arg Asp Arg Gln Gly Gln Pro Glu Ser Cys Leu Arg	80
65 70 75	
Phe Thr Ser Pro Gln Trp Gly Leu Pro Phe Leu Asn Gly Thr Glu Ala	95
85 90	
Asn Gly Thr Gly Ala Thr Glu Pro Cys Thr Asp Gly Trp Ile Tyr Asp	110
100 105	
Asn Ser Thr Phe Pro Ser Thr Ile Val Thr Glu Trp Asp Leu Val Cys	125
115 120	
Ser His Arg Ala Leu Arg Gln Leu Ala Gln Ser Leu Tyr Met Val Gly	140
130 135	
Val Leu Leu Gly Ala Met Val Phe Gly Tyr Leu Ala Asp Arg Leu Gly	160
145 150 155	
Arg Arg Lys Val Leu Ile Leu Asn Tyr Leu Gln Thr Ala Val Ser Gly	175
165 170	

Thr Cys Ala Ala Phe Ala Pro Asn Phe Pro Ile Tyr Cys Ala Phe Arg
 180 185 190
 Leu Leu Ser Gly Met Ala Leu Ala Gly Ile Ser Leu Asn Cys Met Thr
 195 200 205
 Leu Asn Val Glu Trp Met Pro Ile His Thr Arg Ala Cys Val Gly Thr
 210 215 220
 Leu Ile Gly Tyr Val Tyr Ser Leu Gly Gln Phe Leu Leu Ala Gly Val
 225 230 235 240
 Ala Tyr Ala Val Pro His Trp Arg His Leu Gln Leu Leu Val Ser Ala
 245 250 255
 Pro Phe Phe Ala Phe Phe Ile Tyr Ser Trp Phe Phe Ile Glu Ser Ala
 260 265 270
 Arg Trp His Ser Ser Ser Gly Arg Leu Asp Leu Thr Leu Arg Ala Leu
 275 280 285
 Gln Arg Val Ala Arg Ile Asn Gly Lys Arg Glu Glu Gly Ala Lys Leu
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 Ser Met Glu Val Leu Arg Ala Ser Leu Gln Lys Glu Leu Thr Met Gly
 305 310 315 320
 Lys Gly Gln Ala Ser Ala Met Glu Leu Leu Arg Cys Pro Thr Leu Arg
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 His Leu Phe Leu Cys Leu Ser Met Leu Trp Phe Ala Thr Ser Phe Ala
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 Tyr Tyr Gly Leu Val Met Asp Leu Gln Gly Phe Gly Val Ser Ile Tyr
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 370 375 380
 Gly Phe Leu Val Ile Asn Ser Leu Gly Arg Arg Pro Ala Gln Met Ala
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 Ala Leu Leu Leu Ala Gly Ile Cys Ile Leu Leu Asn Gly Val Ile Pro
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 Cys Leu Ala Ala Ser Phe Asn Cys Ile Phe Leu Tyr Thr Gly Glu Leu
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 Tyr Pro Thr Met Ile Arg Gln Thr Gly Met Gly Met Gly Ser Thr Met
 450 455 460
 Ala Arg Val Gly Ser Ile Val Ser Pro Leu Val Ser Met Thr Ala Glu
 465 470 475 480
 Leu Tyr Pro Ser Met Pro Leu Phe Ile Tyr Gly Ala Val Pro Val Ala
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 Ala Ser Ala Val Thr Val Leu Leu Pro Glu Thr Leu Gly Gln Pro Leu
 500 505 510
 Pro Asp Thr Val Gln Asp Leu Glu Ser Arg Trp Ala Pro Thr Gln Lys
 515 520 525
 Glu Ala Gly Ile Tyr Pro Arg Lys Gly Lys Gln Thr Arg Gln Gln Gln
 530 535 540
 Glu His Gln Lys Tyr Met Val Pro Leu Gln Ala Ser Ala Gln Glu Lys
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 Asn Gly Leu